

REMARKS

Reconsideration and allowance of the present application based on the following remarks are respectfully requested.

Claims 1, 3, 5 7 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kunii (US Patent Number. 5,420,713) in view of Tada (US Patent Number 5,448,121).

Claims 11, 13, 15 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kunii in view of Tada as applied to claims 1, 3, 5, 7 and 9 above, and further in view of Suzuki (5,903,300). Claims 2, 4, 6, 8 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kunii in view of Tada as applied to claim 1 above, and further in view of Norris (US Patent Number 5,925,955). Claims 12, 14, 16 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kunii in view of Tada and Norris as applied to claims 1-2, 4, 6, 8 and 10 above, and further in view of Suzuki (US Patent Number 5,903,300). These grounds of rejection are respectfully traversed.

Claim 11 has been amended by adding the phrase, "relative to."

Claim 1 defines a light deflecting electric motor. The motor's stator assembly includes a base, a fixed shaft fixed to the base and a stator mounted on the base. It has a rotor assembly including a rotating member rotatably mounted on a plurality of bearing further mounted on the fixed shaft, a polygon mirror mounted on the rotating member and a rotor mounted on the rotating member, the rotor assembly having a center of gravity located between the bearings, and a balancing plane provided in the vicinity of a plane which is generally perpendicular to a center of rotation of the rotor assembly and passes the center of gravity of the rotor assembly.

The rotor assembly has a balancing plane substantially co-planar with a plane which is generally perpendicular to the center of rotation of the rotor assembly and passes the center of gravity of the rotor assembly. This construction reduces or limits an occurrence of gyroscopic moment of the rotor assembly during high-speed rotation. Consequently, oscillation of the polygon mirror is reduced. Because the center of gravity of the rotor assembly is located between the bearings, the amount of oscillation of the polygon mirror is further reduced. Additionally, the number of times that it is necessary to perform a balance adjustment is reduced when a single balancing plane is provided to be substantially co-planar with the plane which is generally perpendicular to the center of rotation of the rotor assembly and passes the center of gravity of the rotor assembly.

Kunii discloses a light deflecting electric motor comprising a stator coil 31 disposed on a base member 2a, a fixed shaft 15 fixed to the base member 2a, and a rotating shaft member 20 rotatably mounted on a plurality of bearings 19 and 19a further mounted on the base member 2a. A polygon mirror 11, rotor member 25 and rotor magnet 30 are mounted on the shaft member 20. The rotor member 25 has an annular groove 26 on an upper surface thereof. However, Kunii is devoid of teaching with respect to the center of gravity of a rotor assembly including the shaft member 20, polygon mirror 11, rotor member 25 and rotor magnet 30.

Tada discloses a pneumatic and magnetic bearing type motor comprising a rotor assembly including a hollow rotary member 4, polygon mirror 11 and magnets 6 and 8. The rotor assembly has a center of gravity 15 located between bearings. However, Tada discloses nothing about a balancing plane substantially co-planar with a plane which is generally perpendicular to the center of rotation of the rotor assembly and passes the center of gravity 15 of the rotor assembly.

Therefore, the claim 1 invention does NOT result even from the combined teachings of Kunii and Tada. Accordingly, claim 1 is believed to be allowable.

Suzuki discloses a deflection scanning apparatus comprising a base 2, bearings 3 supported in the base 2, a rotation shaft 4, rotor 6, stator 7 and polygon mirror 8. The polygon mirror 8 has two annular grooves 32a and a reflecting surface 8a. The grooves 32a are shown as being located inside relative to the reflecting surface 8a.

Claims 11, 13, 15 and 17 depend indirectly from claim 1. Even adding Suzuki's teachings to those of Kunii and Tada, one or ordinary skill in the art to which these claims apply would not create the inventions defined by these claims. Therefore, claims 11, 13, 15 and 17 are believed to be allowable.

Norris discloses a labyrinth seal for use in electronic spindle motors having ball bearing rings 18. The ball bearing rings 18 generally include metallic or ceramic ball bearings 20. Thus, Norris teaches use of ceramic ball bearings.

Claims 2, 4, 6, 8 and 10 depend directly or indirectly from claim 1. Adding the teachings of Norris to those described above, does not result in the inventions defined by these claims. Therefore, claims 2, 4, 6, 8 and 10 are believed to be allowable.

Suzuki discloses the polygon mirror 8 having two annular grooves 32a located inside relative to the reflecting surface 8a as described above.

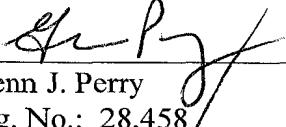
Claims 12, 14, 16 and 18 depend indirectly from claim 1. Each of claims 12, 14, 16 and 18 would not result even with the further combination of Norris and Suzuki. Therefore, claims 12, 14, 16 and 18 are believed to be allowable.

In view of the foregoing, the claims are now believed to be in form for allowance, and such action is hereby solicited. If any point remains in issue which the Examiner feels may be best resolved through a personal or telephone interview, please contact the undersigned at the telephone number listed below.

Attached is a marked-up version of the changes made to the specification and claims by the current amendment. The attached Appendix is captioned "Version with markings to show changes made".

All objections and rejections having been addressed, it is respectfully submitted that the present application is in a condition for allowance and a Notice to that effect is earnestly solicited.

Respectfully submitted,  
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Enclosure: Appendix